

NIOSH Fire Fighter Fatality Investigation and Prevention Program Annual Report: 2002

Foreword

In fiscal year 1998, Congress recognized the need for further efforts to address the continuing national problem of fire fighter line-of-duty deaths, and funded the Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH) to undertake this effort, thus creating the Fire Fighter Fatality Investigation and Prevention Program.

The overall goal of this program is to better define the magnitude and characteristics of line-of-duty deaths and severe injuries among fire fighters, to develop recommendations for the prevention of these injuries and deaths, and to disseminate prevention strategies.

Introduction

This report focuses on ***traumatic injury fatality*** investigations performed by the team based in NIOSH's Division of Safety Research in Morgantown, West Virginia. Traumatic injury investigations include fatalities due to asphyxia, motor vehicle-related (MVR) incidents, electrocution, burns, drowning, and other blunt trauma. A separate NIOSH team investigates cardiovascular-related fatalities.

This report includes only traumatic injury fatalities investigated by NIOSH. Investigations performed during the current year may include incidents that occurred in prior years. Comprehensive figures on fire fighter fatalities are available from the United States Fire Administration (www.usfa.fema.gov) and the National Fire Protection Association (www.nfpa.org).



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Overview

In 2002, NIOSH investigations took place in 20 states (Figure 1). There were 27 fatal incidents investigated, involving 34 victims. One investigation was done in each of fourteen states; five states had two investigations; and one state had three investigations.

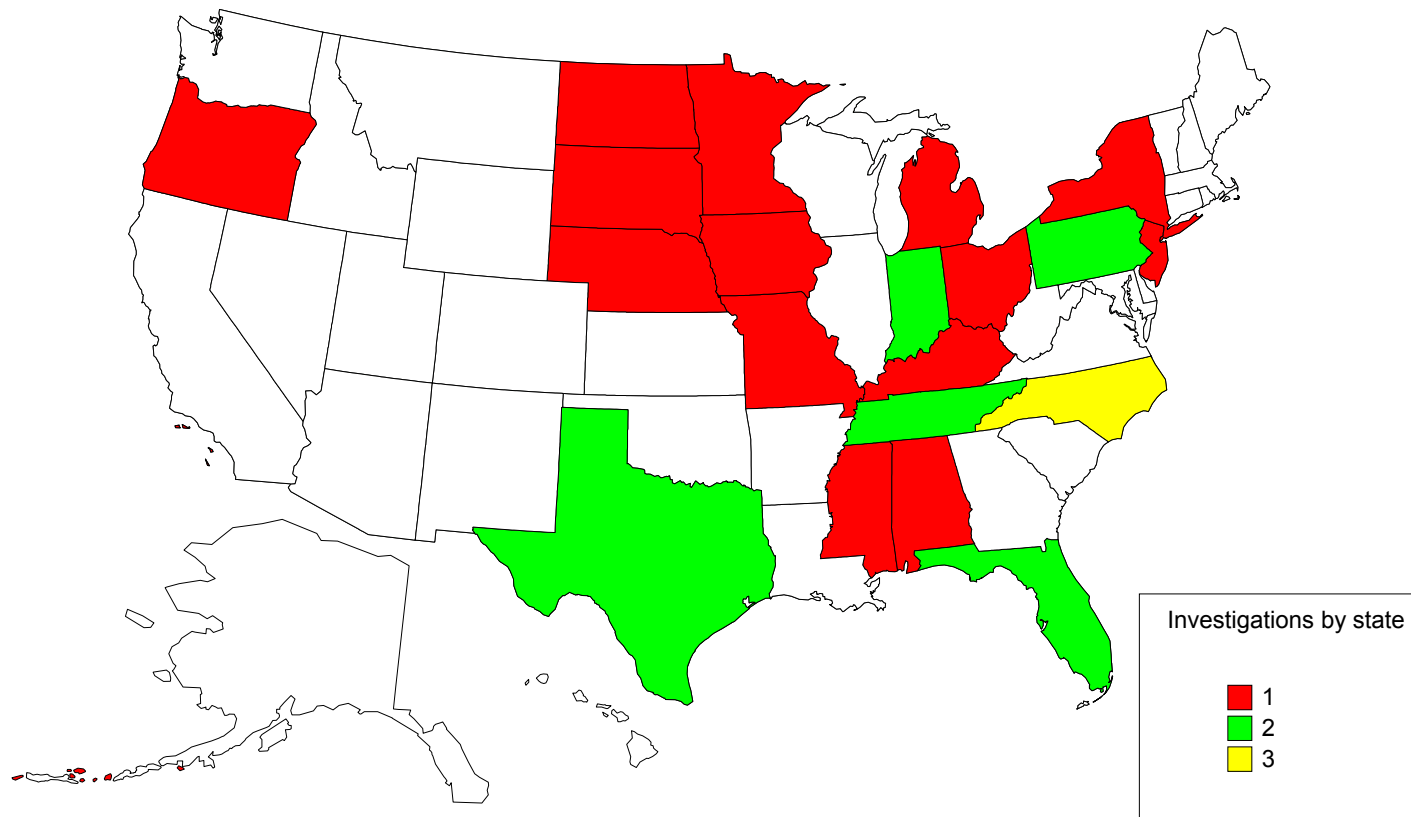


Figure 1. Investigations performed by the NIOSH Fire Fatality Investigation and Prevention Program in 2002

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Victims

The 34 victims included 17 career fire fighters and 17 volunteer fire fighters, with an average age of 31 years. The ages of fire fighters ranged from 14-61 years old, with four female and 30 male victims. The 14 year old was a junior volunteer fire fighter. The average career victim was 40 years old, and had served 11 years as a fire fighter. The average volunteer victim was 30 years old, and had served 7 years.

Causes of fire fighter deaths investigated in 2002 include asphyxiation, burns, drowning, MVR trauma, and non-MVR trauma. MVR trauma includes vehicle crashes as well as fire fighters on foot or bicycle who are struck by motor vehicles. The majority of the career fire fighter victims' deaths were attributed to burns, asphyxiation and traumatic injury other than MVR. Examples of traumatic injuries include those suffered in a structural collapse or a fireworks explosion. The cause of death attributed to most of the volunteer fire fighter victims was MVR trauma.

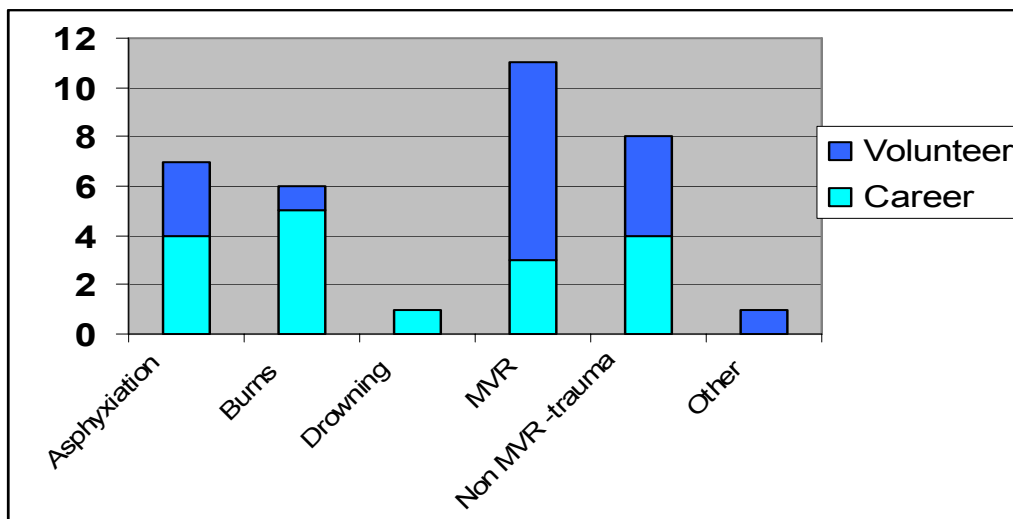


Figure 2. Causes of death by type of department for 2002

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Departments

Departments involved in investigations included seven career, 12 volunteer, and eight combination departments. Combination departments include career and volunteer fire fighters. Figure 3 illustrates the average number of personnel with averages ranging from 31 personnel in volunteer departments to 665 in career departments. The average number of square miles covered by departments range from 44 miles in a volunteer department to 312 miles in combination departments (Figure 4). The volunteer departments served an average population of 10,417, while the average for career departments was 405,486 (Figure 5).

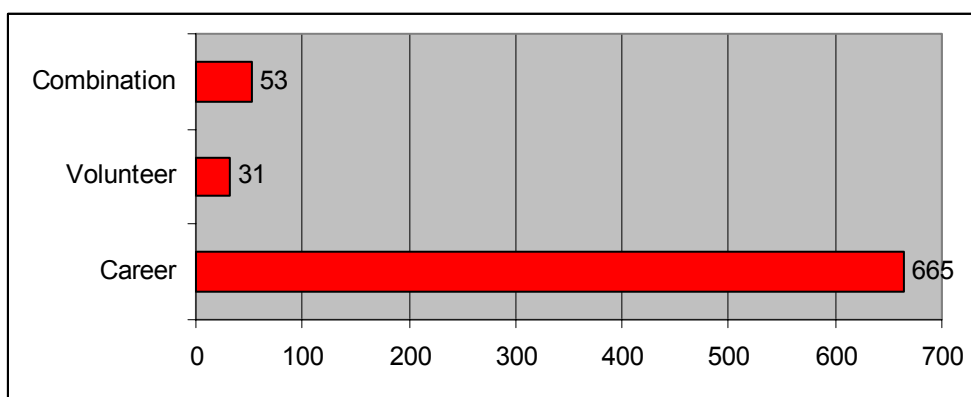


Figure 3. Average Number of Personnel

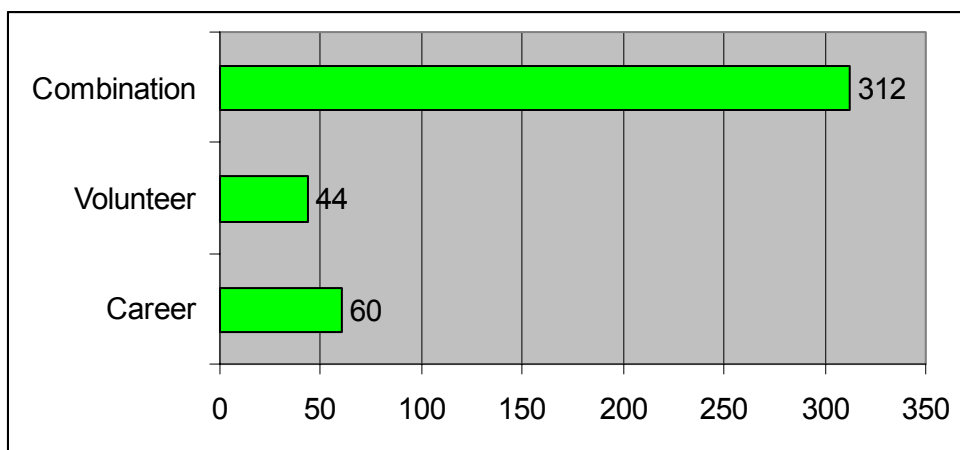


Figure 4. Average Square Miles Covered

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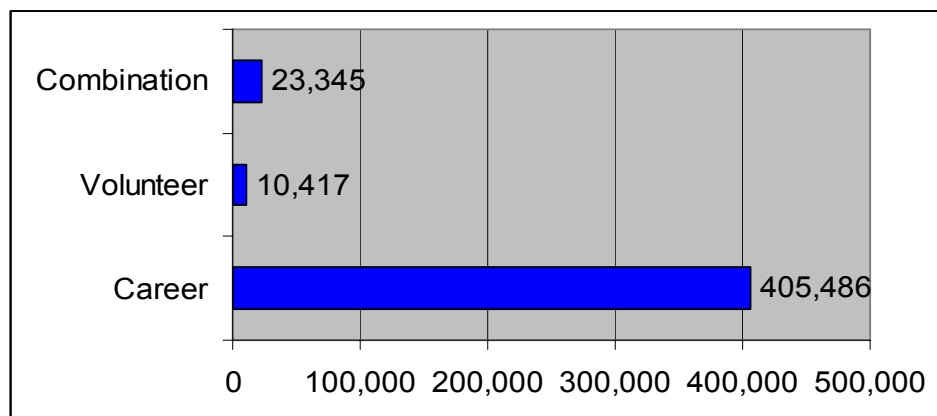


Figure 5. Average Population Served

Incidents

The team investigated 17 structural fire-related fatalities, 12 MVR fatalities and six other types, including scuba diving training and a public fireworks incident.

More than 55 percent of the fatal incidents occurred on the fireground, while 12 percent occurred during travel. Another 12 percent occurred during training. The investigations of structural fire victims involved 11 career fire fighters and six volunteers. Twelve MVR investigations were performed, nine of which involved volunteers.

Table 1. Details on fatal injuries for the NIOSH Fire Fatality Investigation and Prevention Program in 2002.

Fatal Injury	Location of Fatal Incident	Number of Victims	Percent
ASPHYXIATION	EMERGENCY SCENE – FIREGROUND	7	20.6
BURNS	EMERGENCY SCENE - FIREGROUND	4	11.8
BURNS	TRAINING SITE	2	5.9
DROWNING	TRAINING SITE	1	2.9
MVR	EMERGENCY SCENE – FIREGROUND	1	2.9
MVR	EMERGENCY SCENE – MVR	4	11.8
MVR	TRAVEL TO INCIDENT	5	14.7
MVR	TRAVELING FROM TRAINING SITE	1	2.9
MVR	RIDING BIKE TO STATION	1	2.9
NON-MVR TRAUMA	EMERGENCY SCENE - FIREGROUND	7	20.6
NON-MVR TRAUMA	FIREWORKS DISPLAY	1	2.9

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Structural Fires

Eleven structural fire incidents were investigated. Four of the structural fire investigations involved multiple victims: three incidents with two victims each, and one incident with three victims. Fatalities resulted from structural collapse, running out of air, and smoke inhalation.

Investigators were able to determine the amount of time spent at the scene prior to the fatal injury for 14 of the 17 structural fire victims. The average amount of time spent on-scene was approximately 23 minutes.

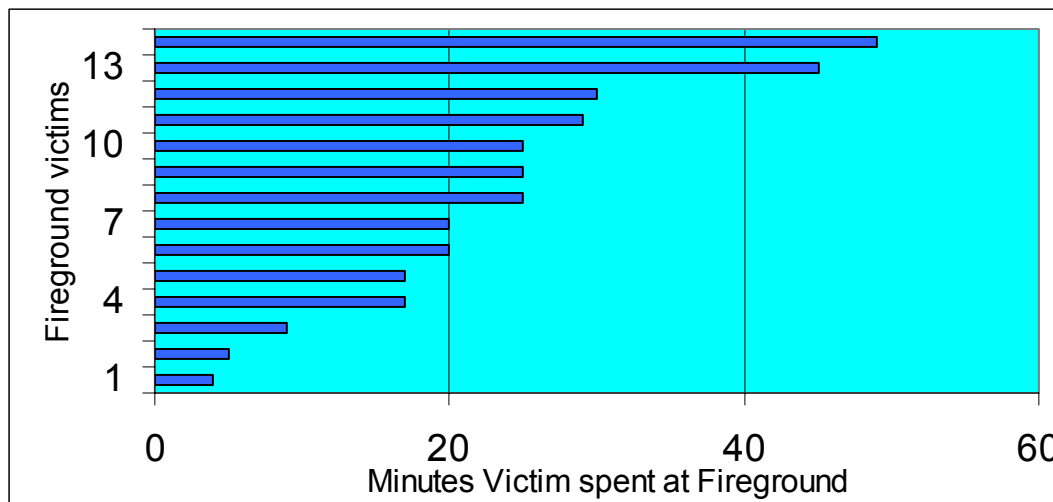


Fig 6. Minutes Victims Spent at Fireground

In the 10 of the 11 structural fire incidents for which it could be determined by investigators, the number of personnel responding ranged from eight to 93.

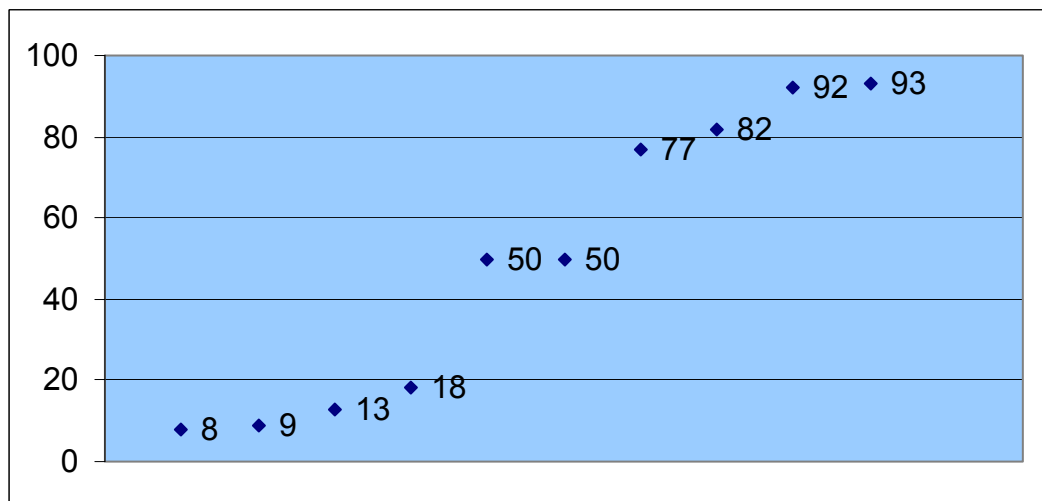


Fig 7 . Number of Fire Fighters Responding

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Eight structural fire incidents had an incident management system in place and three did not.

Motor Vehicle-Related Incidents

The MVR investigations involved six crashes and five struck-by incidents. In the crash incidents, one victim was traveling between departments; one occurred during a training exercise. Four victims were traveling to calls: three of these four victims were drivers and one was a passenger.

Three of the crashes were in tankers; one in an engine; one was in a department sport utility vehicle; and one was in a privately-owned vehicle. Only two of the six victims wore seatbelts.

In the struck-by incidents, two victims were struck by private motor vehicles at motor vehicle crash response scenes; one victim was struck by a fire truck at a motor vehicle crash response scene; one victim was run over by brush truck while fighting a grass fire; and one victim was struck by a private motor vehicle while riding a bicycle to report to the fire station.

Table 2. Apparatus Crashes Investigated by the NIOSH Fire Fighter Fatality Investigation and Prevention Program in 2002.

Crash Fatalities Investigated					
	Vehicle Type	Type of Department	Event	Seating Position	Wearing Seatbelt?
Victim 1	POV	Volunteer	Overturn/rollover	Driver	No
Victim 2	Engine	Volunteer	Overturn/rollover	Front Passenger	Yes
Victim 3	Tanker	Volunteer	Collision with Train	Driver	No
Victim 4	Tanker	Volunteer	Overturn/rollover	Driver	Yes
Victim 5	Tanker	Career	Overturn/rollover	Driver	No
Victim 6	SUV	Volunteer	Overturn/rollover	Driver	Unknown

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Data appearing in this report were derived from the following traumatic fatality investigations:

Number	Title	Report Completed
F2002–41	Career Fire Fighter Dies in Tanker Rollover - North Carolina	✓
F2002–40	Career Fire Fighter Dies After Roof Collapse Following Roof Ventilation – Iowa	✓
F2002–39	Junior Volunteer Fire Fighter Dies in Tanker Rollover – Tennessee	✓
F2002–38	Volunteer Captain Killed, Two Fire Fighters and Police Officer Injured When Struck by Motor Vehicle at Highway Incident – Minnesota	✓
F2002–37	Volunteer Fire Fighter Dies During Wildland Fire Suppression – South Dakota	✓
F2002–36	Volunteer Fire Fighter Dies After Being Run Over by Brush Truck During Grass Fire Attack – Texas	✓
F2002–34	Career Lieutenant and Fire Fighter Die in a Flashover During a Live-Fire Training Evolution – Florida	✓
F2002–31	Volunteer Fire Fighter Dies Due to Inadvertent Fireworks Discharge – North Dakota	✓
F2002–21	Junior Fire Fighter Killed While Responding to Fire Alarm on His Bicycle – Pennsylvania	✓
F2002–20	Two Career Fire Fighters Die in Four-Alarm Fire at Two-Story Brick Structure – Missouri	✓
F2002–18	Career Fire Chief Dies After Being Struck by a Fire Truck at a Motor–	✓

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	Vehicle Incident – Kansas	
F2002– 17	Fire Fighter Dies During the Night at Fire Station - Kansas	✓
F2002– 16	Volunteer Fire Fighter Dies and Two are Injured in Engine Rollover – Alabama	✓
F2002– 15	Career Fire Fighter Drowns During Final Dive of Training Course - Indiana	✓
F2002– 14	Civilian Jumps From Fourth–Story Window of Burning Apartment Building and Strikes Career Fire Fighter – Michigan	✓
F2002– 13	Volunteer Fire Fighter Dies After Being Struck by Motor Vehicle on Interstate Highway – Mississippi	✓
F2002– 12	Volunteer Fire Fighter Killed and Career Chief Injured During Residential House Fire – Tennessee	✓
F2002– 11	One Career Fire Fighter Dies and a Captain Is Hospitalized After Floor Collapses in Residential Fire – North Carolina	✓
F2002– 10	Volunteer Fire Fighter Dies After Tanker Truck Is Struck by Freight Train – Kentucky	✓
F2002– 07	One Career Fire Fighter Dies and Another Is Injured After Partial Structural Collapse – Texas	✓
F2002– 06	First–Floor Collapse During Residential Basement Fire Claims the Life of Two Fire Fighters (Career and Volunteer) and Injures a Career Fire Fighter Captain – New York	✓

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F2002-04	Motor-Vehicle Incident Claims Life of Volunteer Fire Fighter – Ohio	✓
F2002-32	Two Volunteer Fire Chiefs and One Career Fire Fighter Died at Structural Collapse - NJ	✓
F2002-35	Off-Duty Career Fire Fighter Died and Another Fire Fighter Injured After Being Struck by a Truck- FL	
F2002-49	Volunteer Lieutenant Dies Following Structural Collapse- PA	